Transmitters: ST130 Series

**ST131** RTD input head-mount transmitter

**Description**

The ST131 is a low-cost two-wire transmitter that converts a 100 ohm Platinum RTD sensor input to a proportional 4-20mA signal. Power is received from the output loop current. The transmitter provides sensor excitation and includes linearization, lead-wire compensation, and lead-break detection functions. Setup and calibration are fast and easy with a convenient USB connection to your PC and Acromag’s Windows configuration software.

Advanced signal processing capabilities, variable range input, and convenient USB programming make this instrument a very versatile temperature transmitter for RTD and resistance elements. These transmitters are designed to withstand harsh industrial environments and operate reliably across a wide temperature range with very low drift. They feature RFI, EMI, ESD, EFT, and surge protection plus low radiated emissions.

**Key Features & Benefits**

- Easy setup and digital calibration via USB with Windows configuration software
- Flexible RTD or linear resistance input ranges
- Supports any 100 ohm Pt RTD (375-393 alpha)
- High accuracy and linearity
- Advanced analog signal conditioning ASIC eliminates digitization errors
- Low temperature drift
- Fast response time (< 500µs)
- Programmable over/under-range limits
- Selectable upscale or downscale operation for sensor errors and lead-break detection
- NAMUR NE43 compliant fault response
- Reverse polarity protected with non-polarized output
- Mounts in DIN Form B sensor heads
- Optional DIN rail adapter
- Wide ambient operation (-40 to 80°C)
- Hardened for harsh environments
- CE Compliant, UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

**100 ohm Pt RTD or 0-900 ohm input • 4-20mA output • Loop-powered, 9-32V DC**

**Dimensions**

Dimensions in millimeters (inches)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value 1 (mm)</th>
<th>Value 2 (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>33.00</td>
<td>1.299</td>
</tr>
<tr>
<td>Height</td>
<td>16.50</td>
<td>0.650</td>
</tr>
<tr>
<td>Depth</td>
<td>5.15</td>
<td>0.203</td>
</tr>
<tr>
<td>Diameter</td>
<td>6.48</td>
<td>0.255</td>
</tr>
<tr>
<td>Hole Diameter</td>
<td>5.28</td>
<td>0.208</td>
</tr>
</tbody>
</table>

**Input Connections**

PT RTD or resistance
- 4-WIRE
- 3-WIRE
- 2-WIRE

**Output Connections**

DC Supply (9-32V)
- EARTH
- LOAD
- OUT
- IN

**Key Features & Benefits**

- **USB Configured**
- **ST130 Series Transmitter Configuration Software is downloadable (FREE) from www.acromag.com.**

**Acromag**

THE LEADER IN INDUSTRIAL I/O

Tel 248-295-0880  ■  Fax 248-624-9234  ■  sales@acromag.com  ■  www.acromag.com  ■  30765 Wixom Rd, Wixom, MI 48393  USA

Bulletin #8400-625j
### Transmitters: ST130 Series

#### ST131 RTD input head-mount transmitter

**Performance Specifications**

**Output Compliance**
\[
R_{\text{load}} = \left(\frac{V_{\text{supply}} - 9V}{0.02A}\right)
\]
\[
R_{\text{load}} = 0 \text{ to } 750 \text{ ohms} \div 24V \text{ DC}
\]

**Output Accuracy**
Better than ±0.1% of span, typical for spans less than 500°C. Includes the effects of repeatability, terminal point conformity, and linearization, but does not include sensor error.

**Ambient Temperature Effect**
Better than ±0.010% per °C of input span or ±80ppm/°C, typical. Includes the combined effects of zero and span drift over temperature.

**Output Response Time**
500μs, typical with 250 ohm load.

**Environmental**
- **Operating temperature**: -40 to 80°C (-40° to 176°F)
- **Storage temperature**: -40 to 85°C (-40° to 185°F)
- **Relative humidity**: 5 to 95% non-condensing
- **Power Requirement**: 9-32V DC SELV (Safety Extra Low Voltage), 28mA max
- **Isolation**: Not isolated

**Shock and Vibration Immunity**
- Vibration: 5g, per IEC 60068-2-64
- Shock: 50g, per IEC 60068-2-27

**Radiated Emissions**
- BS EN 61000-6-4, CISPR 16
- Radiated Field Immunity (RFI)
- Conducted RF Immunity (CMR)
- Electrostatic Discharge (ESD)
- Electrical Fast Transient (EFT)
- Surge Immunity

**Approvals**
- CE compliant. UL/cUL listings. ATEX Certified.
- Designed for Class I; Division 2; Groups ABCD; Zone 2
- G Ex nA IIC T4 Gc -40°C ≤ Ta ≤ +80°C

**Physical**
- **General**
  - General purpose enclosure with potted circuit designed for mounting in DIN Form B connection heads.
  - **DIN-Rail Mounting**
  - Using optional ST130-DIN adapter, unit can mount to 35x15mm, T-type or G-type DIN rails.

**Specifications**

- **RTD input head-mount transmitter**
- **Model**: ST131-0600
- **Description**: 100 ohm Pt RTD input, CE Compliant.
  - Default calibration: Pt385 RTD, 3-wire, 0-200°C input, 4-20mA output, upscale fault detect.

**Accessories**
- Connection Head Enclosures: See Bulletin 8400-630 or www.acromag.com for info.
- **ST130-DIN**
  - DIN-rail adapter.
- **ST130-MTG**
  - Replacement mounting kit (screws and relief springs) for installing ST130 transmitter in a DIN Form B connection head.
- **USB-ISOLATOR**
  - USB-to-USB isolator, includes USB cable (4001-112).

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**Specifications**

- **USB Interface**
  - **USB Connector**: USB Mini-B type socket, 5-pin.
- **USB Data Rate**: 12Mbps. USB v1.1 and 2.0 compatible.
- **USB Transient Protection**: 25 ohms per lead.
- **USB Data Rate**: 12Mbps. USB v1.1 and 2.0 compatible.
- **USB Connector**: USB Mini-B type socket, 5-pin.

- **Input**
  - **Input Configuration**: Two-, three- or four-wire sensor input connections.
  - **Input Ranges**: 100 ohm Platinum RTD, alpha = 375-393, 385 (default), -50 to 900°C (-58 to 1652°F).
  - **Zero Adjust**: RTD 3/4 wire: -50, -17.78, or 0°C (-58, 0, 32°F).
  - **Full-Scale Adjust**: RTD: up to 900°C (1652°F), 50°C (58°F) span minimum.
  - **Excitation Current**: 0.5mA, nominal.
  - **Lead-Wire Compensation**: 25 ohms per lead.
  - **Lead Break (Sensor Burnout) Detection**: Configurable for either upscale or downscale.

- **Output**
  - **Output Range**: 4 to 20mA DC.
  - **Output Fault Limits (Sensor Fault)**: 0.4mA below selected under-scale threshold and 1.0mA above over-scale threshold, typical.
  - **Case Material**: Self-extinguishing polycarbonate ABS plastic, UL94 V-0 rated base material. USB dust cap material is Santoprene, 251-70W232.
  - **Printed Circuit Board**: Military grade fire-retardant epoxy glass per IPC-4101/98 with humi-seal conformal coating.
  - **I/O Connectors**: Barrier strip type, captive screw terminals.
  - **Dimensions**: Diameter = 44.5mm (1.75 inches), Height = 23.4mm (0.92 inches).
  - **Shipping Weight**: 0.5 pounds (0.22 Kg) packed.

- **Ordering Information**
  - **Models**
    - ST131-0600: Transmitter, 100 ohm Pt RTD input, CE Compliant.
    - Default calibration: Pt385 RTD, 3-wire, 0-200°C input, 4-20mA output, upscale fault detect.
  - **ST131-0610**: Same as ST131-0600 plus UL/cUL Class 1 Div 2 Zone 2 approval and ATEX Certified.
  - **ST130-MTG with each unit.**

- **Services**
  - **ST13x-Config/Cal**: Factory custom configuration/calibration service.
  - Specify input type, input/output zero and full-scale values, filtering, and sensor fault settings on order.

- **Software**
  - **ST13C-SIP**: Software Interface Package. Includes configuration software (ST130-CONFIG), isolator (USB-Isolator) and two USB cables (Part # 4001-112, 4001-113) for Acromag ST130 Series head-mount transmitters.
  - One (1) kit recommended per customer.

- **Accessories**
  - **Connection Head Enclosures**: See Bulletin 8400-630 or www.acromag.com for info.
  - **ST130-DIN**: DIN-rail adapter.
  - **ST130-MTG**: Replacement mounting kit (screws and relief springs) for installing ST130 transmitter in a DIN Form B connection head.
  - **USB-ISOLATOR**: USB-to-USB isolator, includes USB cable (4001-112).
Transmitters: ST130 Series

ST132 Thermocouple/millivolt input head-mount transmitter

**Description**

The ST132 is a low-cost two-wire transmitter that converts a millivolt or thermocouple sensor input to a proportional 4-20mA control signal. Power is received from the output loop current. The transmitter performs signal linearization, cold-junction compensation, and lead-break detection functions.

Setup and calibration are fast and easy with a convenient USB connection to your PC and Acromag’s Windows configuration software.

Advanced signal processing capabilities, variable range input, and convenient USB programming make this instrument a very versatile temperature measurement device. These transmitters can withstand harsh industrial environments and operate reliably across a wide temperature range with very low drift. They feature RFI, EMI, ESD, EFT, and surge protection plus low radiated emissions.

**Key Features & Benefits**

- Easy setup and digital calibration via USB with Windows configuration software
- Flexible thermocouple or millivolt input ranges (TC Type J, K, T, R, S, E, B, N or ±100mV)
- 24-bit A/D microcontroller
- High accuracy, linearity, stability, and reliability
- Low temperature drift (<75ppm/°C)
- Fast response time (as low as 8ms)
- Supports reverse-acting (inverse) output
- Selectable upscale or downscale operation for sensor errors and lead-break detection
- Non-polarized output/power connection
- Mounts in DIN Form B sensor heads
- Shock (50g) and vibration (5g) resistant
- Optional DIN rail adapter
- Wide ambient operation (-40 to 80°C)
- Hardened for harsh environments
- CE compliant. UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

Universal thermocouple (8 types) or ±100mV input ◆ 4-20mA output ◆ Loop-powered, 7-32V DC

ST132 software allows you to configure transmitters offline, save the file, and download settings into units later, at your convenience.

ST130 Series Transmitter Configuration Software is downloadable (FREE) from www.acromag.com.
Transmitters: ST130 Series

Performance Specifications

**Input Ranges and Accuracy**

<table>
<thead>
<tr>
<th>Input</th>
<th>Range</th>
<th>Accuracy ±0.5°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC J</td>
<td>-210 to 760°C (-346 to 1400°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>TC K</td>
<td>-200 to 1372°C (-328 to 2502°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>TC T</td>
<td>-260 to 400°C (-436 to 752°F)</td>
<td>±0.5°C</td>
</tr>
<tr>
<td>TC R</td>
<td>-50 to 1768°C (-58 to 3214°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>TC S</td>
<td>-50 to 1768°C (-58 to 3214°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>TC E</td>
<td>-200 to 1000°C (-328 to 1832°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>TC B</td>
<td>260 to 1820°C (500 to 3308°F)</td>
<td>±1.0°C</td>
</tr>
<tr>
<td>TC N</td>
<td>230 to 1300°C (-382 to 2372°F)</td>
<td>±1.0°C</td>
</tr>
</tbody>
</table>

**Thermocouple Reference**

(Cold Junction Compensation)

±0.1°C typical, ±0.3°C maximum at 25°C.

**Ambient Temperature Effect**

Better than ±75ppm/°C (±0.0075%/°C).

**Zero Scaling Adjust**

0 to 95% of range, typical.

**Full Scale Adjust**

5 to 100% of full scale range, typical.

**Lead Break (Sensor Burnout) Detection**

Configurable for either upscale or downside.

**Thermocouple Input Bias Current**

±250mA typical (TC break).

**Input Over-Voltage Protection**

Bipolar Transient Voltage Suppressors (TVS), 5.6V clamp level typical.

**Input Filter Bandwidth**

-3dB at 55Hz, typical, normal mode filter.

**Resolution**

Millivolt input: 0.005% (1 part in 20,000)

Thermocouple input: 0.1°C.

**Input Filter**

Normal mode filtering, plus selectable digital filtering settings (none, low, medium, high) optimized and fixed per input range within the A/D converter.

**Noise Rejection (Normal Mode)**

75dB @ 60Hz, typical with 100 ohm input unbalance.

**Ambient Temperature Effect**

±0.1°C typical, ±0.3°C maximum at 25°C.

**Case Material**

Self-extinguishing polycarbonate ABS plastic, UL94 V-0 rated base material. USB dust cap material is Santoprene, 251-70W232.

**I/O Connectors**

Barrier strip type, captive screw terminals. Wire range: AWG #14-28 solid or stranded.

**Shipping Weight**

0.5 pounds (0.22 Kg) packed.

Ordering Information

**Models**

ST132-0600

Transmitter, thermocouple/millivolt input, CE approval.

ST132-0610

Same as ST132-0600 plus UL/cUL Class 1 Division 2 Zone 2 approval and ATEX Certified.

**Software**

ST13x-Config/Cal

Factory custom configuration/calibration service. Specify input type, input/output zero and full-scale values, filtering, and sensor fault settings on order.

ST13C-SIP

(recommend one kit per customer)

Software Interface Package. Includes configuration software (ST130-CONFIG), isolator (USB-ISOLATOR) and two USB cables (Part # 4001-112, 4001-113) for Acromag ST130 Series head-mount transmitters.

Accessories

Connection Head Enclosures

See Bulletin 8400-630 or www.acromag.com for info.

ST130-DIN

DIN-rail adapter (Type G or T).

ST130-MTG

Replacement mounting kit (screws and relief springs) and two DIN-rail adapter (Type G or T). See Bulletin 8400-630 or www.acromag.com for info.

ST130-CONFIG

USB-to-USB isolator, includes USB cable (4001-112).

ST130-ISOLATOR

USB-to-USB isolator, includes USB cable (4001-112).
**Description**

The ST133 is a low-cost two-wire transmitter that isolates and converts a millivolt or thermocouple sensor input to a proportional 4-20mA control signal. Power is received from the output loop current. The transmitter performs signal linearization, cold-junction compensation, and lead-break detection functions.

High-voltage isolation separates the input from the output circuit. Isolation protects from surges, reduces noise, and eliminates ground loop errors.

Setup and calibration are fast and easy with a convenient USB connection to your PC and Acromag’s Windows configuration software. Advanced signal processing capabilities, variable range input, and convenient USB programming make this instrument a very versatile temperature measurement device. These transmitters can withstand harsh industrial environments and operate reliably across a wide temperature range with very low drift. They feature RFI, EMI, ESD, EFT, and surge protection plus low radiated emissions.

**Key Features & Benefits**

- Easy setup and digital calibration via USB with Windows configuration software
- Flexible thermocouple or millivolt input ranges (TC Type J, K, T, R, S, E, B, N, or ±100mV)
- 1500V input isolation
- 24-bit A/D microcontroller
- High accuracy, linearity, stability, and reliability
- Low temperature drift (<75ppm/°C)
- User selectable filtering (none, low, med., high)
- Fast response time (as low as 90ms)
- Supports reverse-acting (inverse) output
- Selectable upscale or downscale operation for sensor errors and lead-break detection
- Non-polarized output/power connection
- Mounts in DIN Form B sensor heads
- Shock (50g) and vibration (5g) resistant
- Optional DIN rail adapter
- Wide ambient operation (-40 to 80°C)
- Hardened for harsh environments
- CE compliant. UL/cUL Class 1 Div 2 Zone 2 approvals. ATEX Certified.

**ST133 software** allows you to configure transmitters offline, save the file, and download settings into units later, at your convenience.
Transmitters: ST130 Series

**ST130 Series**

Isolated thermocouple input head-mount transmitter with USB-configuration

### Performance Specifications

**IMPORTANT:** To prevent damage or errors from grounded PCs and surges, Acromag strongly recommends use of the USB-ISOLATOR when configuring an ST130 transmitter.

#### USB Interface

**USB Connector**

USB Min-B type socket, 5-pin.

**USB Data Rate**

12Mbps. USB v1.1 and 2.0 compatible.

**USB Cable Length**

5.0 meters maximum.

**USB Transient Protection**

75dB @ 60Hz, typical with 100 ohm input unbalance.

**USB Connector**

USB Mini-B type socket, 5-pin.

- **Input**
  - Default Configuration/Calibration
    - Input: TC J, -210 to 760°C, upscale fault, high filter.
  - Output: 4 to 20mA.

- **Input Ranges and Accuracy**

<table>
<thead>
<tr>
<th>Input</th>
<th>Range</th>
<th>Accuracy</th>
<th>TC J</th>
<th>-210 to 760°C (-346 to 1400°F)</th>
<th>±0.5°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-200 to 1372°C (-328 to 2502°F)</td>
<td>±0.5°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-260 to 400°C (-436 to 752°F)</td>
<td>±0.5°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-50 to 1768°C (-98 to 3214°F)</td>
<td>±1.0°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC S</td>
<td>-50 to 1768°C (-98 to 3214°F)</td>
<td>±1.0°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC T</td>
<td>-200 to 1000°C (-382 to 1832°F)</td>
<td>±1.0°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC B</td>
<td>260 to 1820°C (500 to 3308°F)</td>
<td>±1.0°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC N</td>
<td>300 to 1300°C (-436 to 752°F)</td>
<td>±1.0°C</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>TC N</td>
<td>100 to 100mV</td>
<td>±0.1mV</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Environmental

- **Operating temperature**
  - -40 to 80°C (-40° to 176°F)
- **Storage temperature**
  - -40 to 85°C (-40° to 185°F)
- **Relative humidity**
  - 5 to 95% non-condensing.
- **Power Requirement**
  - 12-32V DC SELV (Safety Extra Low Voltage), 24mA max.
- **Isolation**
  - 1500V AC peak. 250V AC (354V DC) continuous isolation between input and output circuits.
- **Shock and Vibration Immunity**
  - Vibration: 5g, per IEC 60068-2-64.
  - Shock: 50g, per IEC 60068-2-27.
- **Electromagnetic Compatibility (EMC) Compliance**
  - Radiated Emissions: BS EN 61000-6-4, CISPR 16.
  - Conducted EMI: BS EN 61000-6-2, IEC 61000-4-3.
  - Conducted RF: BS EN 61000-6-2, IEC 61000-4-6.
  - ESD: BS EN 61000-6-2, IEC 61000-4-2.
  - EFT: BS EN 61000-6-2, IEC 61000-4-4.
- **Surge Immunity:**
  - BS EN 61000-6-2, IEC 61000-4-5.

#### Ordering Information

**Models**

ST133-1600

Transmitter, thermocouple/millivolt input, CE approval.

ST133-1610

Same as ST133-1600 plus UL/cUL Class 2 Zone 2 approval and ATEX Certified.

**Software**

ST13C-SIP

(Recommend one kit per customer)

Software Interface Package. Includes configuration software (ST130-CONFIG), isolator (USB-ISOLATOR) and two USB cables (Part # 4001-112, 4001-113) for Acromag ST130 Series head-mount transmitters.

**Accessories**

Connection Head Enclosures

See Bulletin 8400-630 or www.acromag.com for info.

ST130-DIN

DIN-rail adapter (Type G or T).

USB-ISOLATOR

USB-to-USB isolator, includes USB cable (4001-112).
Simplifies mounting of ST130 Series transmitters  ◆  Ideal for mounting in the field or in a control room

**Description**
For your convenience, Acromag offers a variety of head-mount enclosures and other mounting accessories to simplify your system installation.

**Ordering Information**
NOTE: For more information visit www.acromag.com.

**Mounting Accessories**

**ST130-MTG**
Replacement mounting Kit – Includes two (2) M4 mounting screws, (2) 6-32 mounting screws, and (2) two relief springs for mounting an ST130 transmitter in a DIN Form B connection head.

4001-115K
Explosion-Proof Aluminum Connection Head – FM/FM/IIIC, Class I, Division I, Groups A, B, C, D, T6; Class II, III, Division 1, Groups E, F, G, T6; NEMA 4 rated. Includes M4 mounting screws and springs.

4001-116K
Explosion-Proof Stainless Steel Connection Head – FM/FM/IIIC, Class I, Division I, Groups A, B, C, D, T6; Class II, Division 1, Groups E, F, G, T6; Class III, NEMA 4X rated. Includes M4 mtg screws and springs.

4001-117K
General-Purpose Aluminum Connection Head – NEMA 4X and IP68 rated. Includes M4 mounting screws and springs.

4001-119K
General-Purpose Cast Iron Connection Head – NEMA 4X rated. Includes M4 mtg screws and springs.

**ST130-DIN**
Series ST DIN Rail Adapter – Includes a DIN rail bracket with mounting screws that connects a ST130 transmitter to a 35mm T-type or G-type DIN rail. Includes M4 mounting screws and springs.